FLIGHT
The AIRCRAFT ENGINEER & AIRSHIPS

First Aero Weekly in the World
Founder and Editor: STANLEY SPOONER
A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport
OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM

No. 676 (No. 49, Vol. XIII.) DECEMBER 8, 1921 [Weekly, Price 6d. Post free, 7d.

Flight

The Aircraft Engineer and Airships

Editorial Offices: 36, GREAT QUEEN STREET, KINGSWAY, W.C.2
Telegrams: Truditur, Westcent, London. Telephone: Gerrard 1828

Annual Subscription Rates, Post Free:
United Kingdom .. 30s. 4d. Abroad .. .. 33s. 0d.*
These rates are subject to any alteration found necessary under abnormal conditions and to increases in postage rates
* *European subscriptions must be remitted in British currency*

CONTENTS

DIARY OF FORTHCOMING EVENTS

Club Secretaries and others desirous of announcing the dates of important fixtures are invited to send particulars for inclusion in the following list:

Dec. 15	Lecture, "Development of the Fighting Aeroplane," by Capt. F. M. Green, before R.Ae.S.
1922.	
Jan. 5	Lecture, "Specialised Aircraft," by Wing-Com. W. D. Beatty, before R.Ae.S.
Jan. 19	Lecture, "Aeroplane Installation," by Brig.-Gen. R. K. Bagnall-Wild, before R.Ae.S.
Feb. 2	Lecture, "Radiological Research," by Dr. V. E. Pullin, before R.Ae.S.
Feb. 7 & 8	Second Air Conference at Guildhall
Feb. 16	Lecture, "Methods of Instruction in Aeroplane Flying," by Sq.-Leader Portal, before R.Ae.S.
Mar. 2.	Lecture, "Testing Aircraft to Destruction," by W. D. Douglas, before R.Ae.S.
Mar. 26–April 2	Nice Meeting
Mar. 30	Lecture, "The Design of a Commercial Aeroplane," by Capt. de Havilland, before R.Ae.S.
July 6–20	French Gliding Competition

EDITORIAL COMMENT

The Next Air Conference

ACCORDING to an Air Ministry *communiqué*, the next Air Conference is to be held in the Guildhall on February 7 and 8, 1922. The *communiqué* sets forth that the first Conference proved so useful in focussing attention on the many intricate problems of aviation and in bringing about a frank exchange of views on the subject, that the Air Ministry has decided to call together this second Conference. The latter is to be opened by the Lord Mayor, and will be asked to address itself mainly to the question of the future of aviation, with special reference to its development as a regular and speedy form of commercial transport. As a matter of convenience the papers will be divided into two main groups, the one dealing with civil aviation in general, and the other with technical problems, the papers on the former subject being delivered at the morning session of the first day, and those on the latter during the afternoon session of the same day. The proceedings on the second day will be devoted wholly to discussions arising out of the previous day's papers, the morning session being allotted to civil aviation, and the afternoon to discussions on the technical papers.

The Secretary of State for Air is to preside during the civil aviation portion of the proceedings, and Lord Weir of Eastwood, a former Air Minister, during the technical sessions. Lord Gorell, Under-Secretary of State for Air, is to read the principal paper on civil aviation, and he will give a general account of progress at home and abroad, and will direct attention to a consideration of the ways and means whereby the development of civil aviation at home and in the Empire may be best furthered; in this connection he will endeavour to enlist the practical co-operation of business and other interests. The principal technical paper is to be contributed by Captain F. M. Green, of Sir W. G. Armstrong, Whitworth Aircraft, Ltd.

We need hardly say that we welcome wholeheartedly the action of the Air Council in calling this Conference together. It cannot do harm, and it can scarcely fail to do good, if only through the amount of wide publicity it must secure to the movement generally. But we cannot but recollect the high hopes we entertained of the first Air Conference

and the results we hoped would be achieved through a full and public discussion of the manifold problems, and the difficulties which must be surmounted if civil aviation is to flourish and to secure its place among the methods of transport which the world has need of. At the time the papers and the ensuing discussions were interesting to a degree. It was pointed out by several contributors to the debates, and generally by the whole Press of the country, that if we are to secure the place in the air which is ours by right, there must be more in the way of encouragement extended by the State to help the movement to find its feet. As things turned out, however, this Conference, called as it was by the Air Council, and therefore held under the direct patronage of the Government, proved to be almost entirely academic in its interest. Of concrete results it achieved none worth speaking of, unless we count to its credit—as we certainly must—the advertising value to the industry of the full reports of the Conference, which were published broadcast in the Press of the country.

We trust that this Conference will be more prolific of actual results than the last. It is of little avail to hold such Conferences when they are really very little different from the proceedings of a debating society. We can get all the views, all the technical conclusions, embodied in papers read before the Royal Aeronautical Society, and other similar bodies. What we want now is a real live Conference, at which the Air Council or its spokesmen have something to say about what the State is prepared to do to help civil aviation along. Let it be understood that we are casting no reflection whatever upon the Air Council, which we believe to be fully alive to the necessities. Where the shoe pinches is in the attitude of the Government, as a whole, to the civil aviation movement. That attitude, as we have more than once pointed out, can only be changed by the pressure of the necessary volume of public opinion. The forthcoming Conference will certainly assist to create that, if it does no other good.

Mapping from the Air

We like the suggestion of *The Times*, that the Air Ministry should publish a report on the progress that has been made with mapping from the air. In a leading article it points out that the Royal Geographical Society has recently printed papers from officers describing the work carried out in Palestine and in Egypt, during and since the War, in correcting from the air the imperfections of existing maps. We gather from another source that considerable progress has been made also in surveying the delta of the Orinoco by means of aeroplane reconnaissances, an undertaking FLIGHT has several times referred to. The Government of British Guiana is contemplating the survey of the hinterland of the colony from the air, mainly with a view of properly locating the open "savannahs," which should be of the greatest value to the colony. In more than one other direction aerial survey is making substantial progress, yet, except through odd references in the Press, we hear very little about it.

As our contemporary very aptly points out, the less support civil aviation is to receive from the State the more it will have to depend upon its commercial applications. Obviously, the more widely known these applications can be made, the more opportunity there will be for Governments and individuals to appreciate the uses to which aerial survey can be put. Such a report as that asked for would not be a costly affair to produce, and there can be no doubt of its great importance in informing those concerned of the enormous potential value of surveying from the air.

The Safety Fuel Tank Competition

The trials which have been taking place at Farnborough, during the past week, of safety tanks and devices for eliminating the fire risk in aircraft has been full of interest. Exactly what results have been achieved it is too early yet to state. We must wait for the official reports and conclusions before we are able to say that anything has been brought to light to completely rule out the risk of machines catching fire either in the air or in case of a crash. Undoubtedly, the trials will demonstrate that considerable progress has been made in the desired direction, which is a great deal to the good. Fire is the worst risk in flying. The fate of "R.38," was eloquent of the fact, and if there were no other similar occurrence on the records it would have been sufficient by itself to warrant close investigation of ways and means of preventing the rupture of the fuel tanks, even in such an extreme case as an airship breaking her back in the air, as "R.38" did over the Humber.

As everybody connected with flying knows, many valuable lives have been lost in bad landings by the fuel tanks bursting, and the petrol catching fire while pilot and passengers were held fast in the wreckage of the machine. During the War, many pilots lost their lives by their tanks being shot through, resulting in the ignition of the escaping fuel. But it needs no words to emphasise the necessity that exists for devising some method of eliminating the fire risk from air travel, and we think the Air Council deserve the thanks of all concerned for the effort that is being made to secure this end. We hope that when the report of the trials is issued it will disclose that the antidote to this appalling risk has been found.

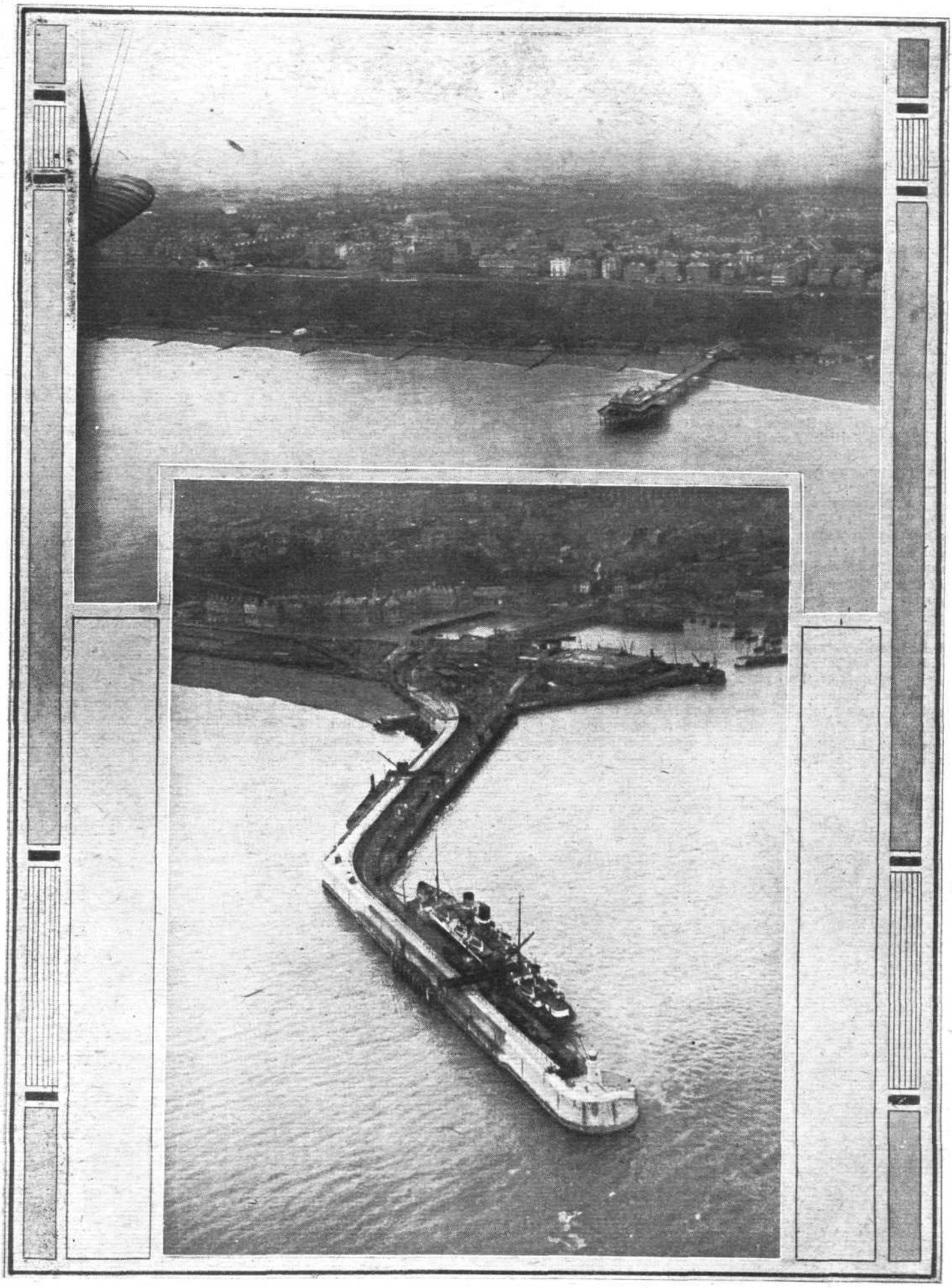
Dvina Relief Force Memorial

MAJ.-GEN. SIR W. E. IRONSIDE unveiled on December 3 the Dvina Relief Force Memorial at the Crystal Palace, and presented it to the trustees of the Imperial War Museum on behalf of the nation, it being accepted by Sir Martin Conway on behalf of the trustees.

The memorial is in honour of the officers and other ranks and ratings of the Naval, Military and Air Forces who fell during the operations of the Dvina Relief Force, North Russia. The roll of honour, containing the names of 96 officers, petty officers, non-commissioned officers and men of the three Services, includes all those who fell in the fighting some 200 miles up the Dvina during July-September, 1919.

This relief force included the Sadleir-Jackson Brigade of the 45th and 46th Battalions of the Royal Fusiliers (London Regiment) and attached units, a naval river flotilla and a seaplane wing. These were part of the forces specially sent out in the early part of that year to relieve the original Dvina Force, which had been engaged throughout the winter of 1918-19, and to assist in the difficult operation of evacuating the Archangel front.

The memorial is in the form of a triplicate picture in oils by Mr. A. Chevallier Tayler, whose son's name appears among the fallen. The incident portrayed is a memorial service which actually took place just before the evacuation. The troops are drawn up in three sides of a hollow square round a large, rough wooden cross erected in the graveyard of a little riverside village church, which, with its shell-torn belfry, is seen in the background. On the left our Navy is represented by bluejackets and marines, and on the right a party of the Royal Air Force is drawn up. At the foot of the cross stand the three commanders, with the brigade chaplain, who is in the act of delivering the blessing.



Copyright, Handley Page, Ltd.

LONDON-PARIS FROM THE AIR, AS SEEN FROM A HANDLEY PAGE MACHINE :

No. 17.—*At top,* **Folkestone Jetty ;** *below,* **Folkestone.**

THE · PARIS · AERO · SHOW · 1921

BY THE TECHNICAL EDITOR

(*Continued from page* 800.)

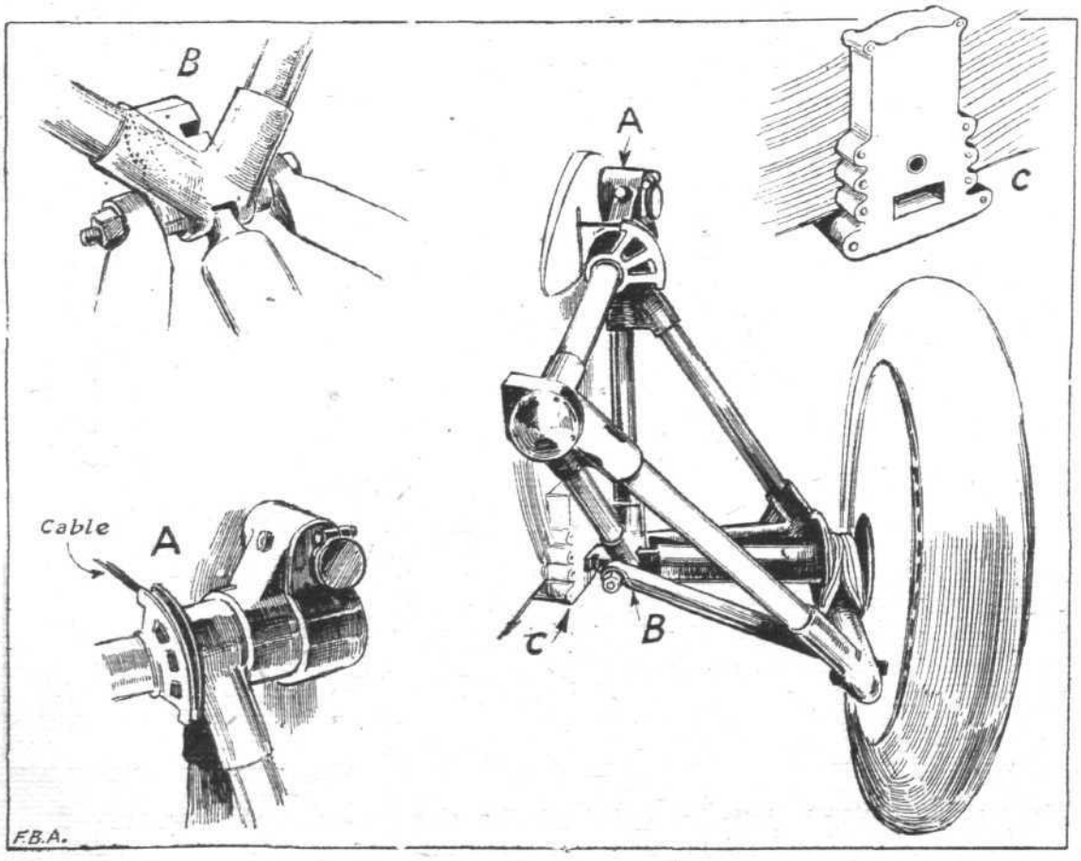
F.B.A.

Quai de Seine, à Argenteuil (S.-et-O.)

THE Franco-British Aviation Co. was formed many years ago, Lieut. Jean Conneau (better known as M. Beaumont from the various great races of the years before the War) being largely interested in the firm. The F.B.A. commenced their activities with the design and construction of flying boats, the F.B.A. being well-known in the R.N.A.S. during the early part of the War. Enquiries on the F.B.A. stand elicited the information that Lieut. Conneau is no longer connected with the firm, but that, nevertheless, flying boats still form the mainstay of the firm's activities. Unfortunately, no complete machines were exhibited at the Salon, there being only two hulls and some wings to show the nature of the firm's work. The hulls are very fine specimens of boat building, and, as regards workmanship and finish, appear to be all that one could wish for. As regards the design, the relative flatness of the hull planing surfaces and steps makes one doubt whether they would survive an *amerrissage* in a rough sea. Our experience on this side of the Channel has been that a fairly pronounced Vee is necessary, if a boat of any size is to stand up to the buffeting of getting off from and alighting in anything of a lop. However, as one does not know anything about the landing speeds, wing loadings, etc., of the two boats, it is scarcely possible to express an opinion on this point. Furthermore, if the boats are designed chiefly for use on comparatively calm lakes or rivers, the sharp Vee form may not be required.

Of the two hulls shown, one is, we understand, intended for a school machine, and does not appear to call for any comment. The other is fitted with an interesting amphibian gear of, it would seem, very substantial construction. Regarding the machine itself we have no information. It appears from the wing roots on the sides of the hull that the boat is to be a biplane, but beyond this fact nothing is known.

The amphibian gear consists of a triangulated framework of steel tubes, hinged near the top of the hull. A worm housed in a casing engages with a worm wheel on the head of the undercarriage struts, and, on being rotated, swings the wheel and strutting outwards and upwards towards the lower plane. The whole arrangement is very simple, as will be seen from the accompanying sketch, and the only feature of it which requires mention is the manner in which some of the load of the gear is relieved by means of rubber shock absorbers. From a quadrant on the top of the



The F.B.A. Flying Boat: Some details of the amphibian gear.

structure a cable passes inside the hull, where it is anchored. This cable, however, incorporates a length of rubber cord, so tensioned that, by the pull which it exerts on the cable, it compensates, to a certain extent, the weight of the amphibian gear. When the latter is down the phosphor-bronze tongue shown in the sketch is housed in a corresponding bronze socket on the side of the hull. The two notches in the sides of the tongue receive the forked ends of a wedge inside the hull, thus locking the undercarriage structure, and preventing the wheel from being lifted outwards and upwards. Before winding up the wheels the pilot, by means of suitable controls, disengages the forked wedge from the notched tongue, and the wheels can be raised easily and quickly. With the exception of the objection to extra wind resistance, which applies to most amphibian gears, that of the F.B.A. appears to be a very sound, straightforward piece of work, whose simplicity and robustness should make it a very practical proposition for actual use, where gentle handling is not always to be counted upon. The use of rubber shock absorbers for relieving the pilot of a certain amount of the work of raising the wheels should result in the possibility of performing this operation more quickly than is possible with gears in which the whole weight of the wheels and strutting has to be lifted by the pilot.

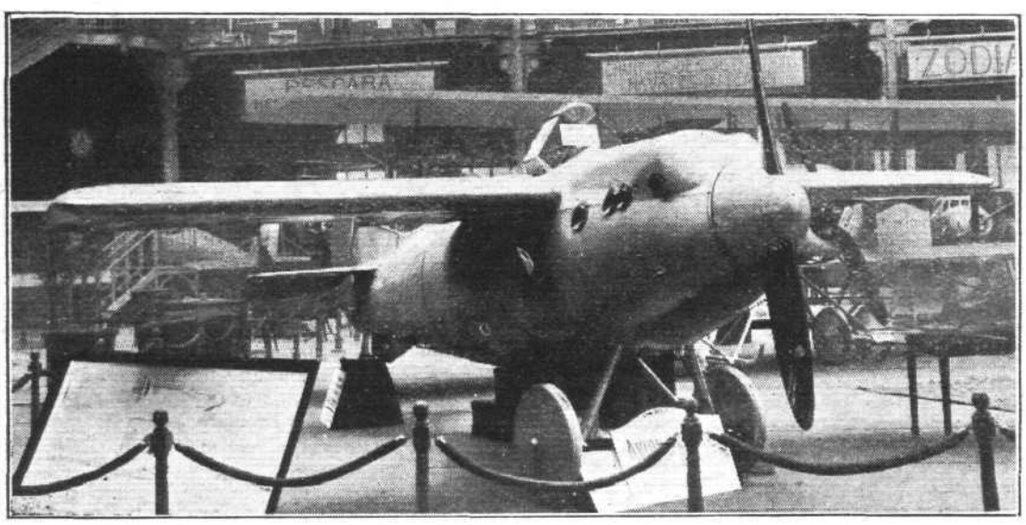
AVIONS HANRIOT

192, 194 and 196, Boulevard Bineau, Neuilly-sur-Seine.

PROBABLY among British readers of FLIGHT, at any rate, the first recollection of a Hanriot aeroplane relates to the little monoplane which made Brooklands unsafe in the very early days of flying. That machine, affectionately known as "Henrietta," had a sort of boat-built body of approximately semi-circular section, and some unusual control levers, which one wobbled from side to side, mounted on the gunwales. From the early start (round about 1909 or so) Hanriot *Père* has continued to design and build original machines, helped of late years by Hanriot *Fils*, who, one remembers, took his "ticket" as a youngster of about 14 or 15 in the early days of aviation. Speed machines have always been associated with the name of Hanriot, and as far back as 1913 or 1914, a very fine monoplane was flying regularly at Brooklands and Hendon, piloted by one Sabelli.

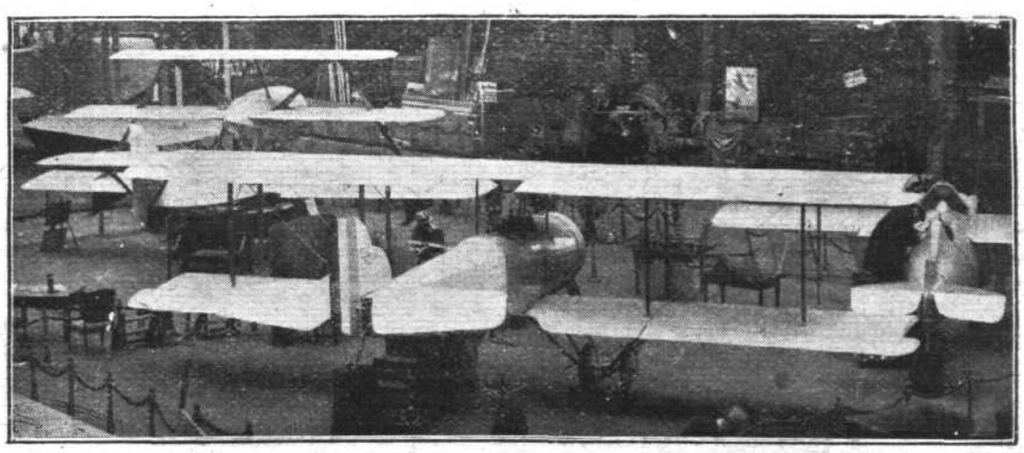
For the Coupe Deutsch held in October last, Hanriots entered a cantilever wing monoplane, which, however, was not finished in time to take part in the race, unless M. Rost was to make his first test flight also an elimination flight for the race. This M. Hanriot refused to let him do, and so the machine was not entered. It was, however, credited with an extraordinarily high speed, as indicated by wind tunnel tests on a model, and great disappointment was felt at the non-starting of the machine in the race. Judging from an inspection of the machine as exhibited at the Grand Palais, one is inclined to think that the machine may quite conceivably be as fast as it was said to be. Its lines are good and there is no external resistance, except that offered by the undercarriage, which, as shown, was not of the "*escamotable*" type. We understand that there is a possibility of Mr. Tait-Cox testing the machine after the finish of the Salon, in which case we shall probably know something more definite about the machine's performance. Tait-Cox is an exceptionally fine test pilot, and we should like him to have the chance of flying such a speedy mount.

As regards the construction of the Hanriot *Avion de Course*, it is built entirely of metal, with the exception of the wing covering, which is fabric. We have been unable to ascertain the details of the wing construction, but it is understood that spars as well as ribs are of metal. The *fuselage* is a triangulated structure of tubing, no bracing wires being used. There are three main *longerons*, braced by smaller tubes forming a series of triangles, and circular formers at intervals support the *fuselage* covering, which is of aluminium. Although this covering is a streamline casing only, and does not, presumably, take any part of the *fuselage* loads, it is of substantial thickness. A fairly hard pressure, applied with the hand failed to produce any appreciable local deflection in the covering. This may be partly due to the double curvature of the covering, which is known to strengthen a shell of this sort very considerably, as instanced in the Supermarine flying boats. The 300 h.p. Hispano-Suiza engine is mounted on a very substantial structure in the nose of the



The Hanriot Coupe Deutsch Racer: This machine is built of metal throughout, except for the wing covering, which is of fabric.

"Flight" Copyright.



The Hanriot School machine.

"Flight" Copyright

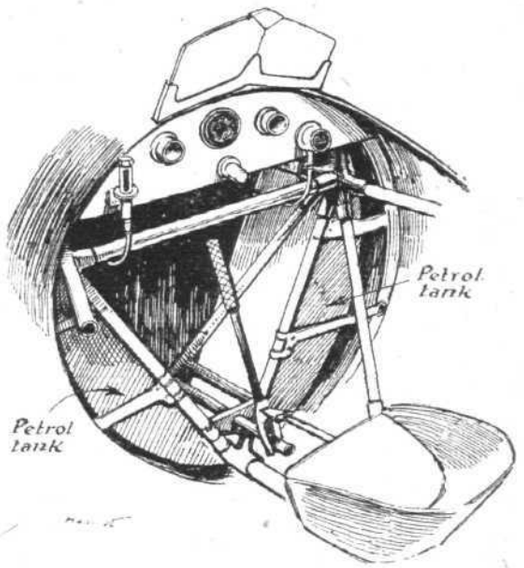
machine, formed mainly by steel strips riveted together to form box-section members. The engine is totally and neatly cowled-in, the camshaft casings being housed in aluminium troughs formed in the engine cowl.

The wings, which are of the thick, high-lift type, are attached to wing roots formed on the top of the *fuselage*, and the absence of any external wing bracing results in a very neat and clean appearance. In this connection it is curious to compare the Nieuport-Delage monoplane which won the Coupe Deutsch and the Hanriot racer. While there is something slender and graceful about the Nieuport-Delage, something almost feminine, there is a look of strength and power about the Hanriot, which is nothing if not masculine. One would imagine that as regards speed the two machines should be fairly evenly matched, fitted as they are with the same type of engine. And it might seem reasonable to suppose that the Nieuport-Delage, with its thin wings and single lift strut on each side, coupled with a *fuselage* of much smaller cross-sectional area, would be a match for the Hanriot. However, although the Hanriot *fuselage* is "fatter" it is quite conceivably of better streamline form than that of the other machine.

The pilot is placed fairly far aft, level, approximately, with the trailing edge of the wings. In front of him he has two radiators which rest on the top of the *fuselage*, with their tops leaning together. This arrangement would not appear to be calculated to improve the view, and one wonders why Hanriot has preferred this arrangement to fitting the ubiquitous Lamblins between the undercarriage struts. Certainly he is not likely to have done it without good and sufficient reason.

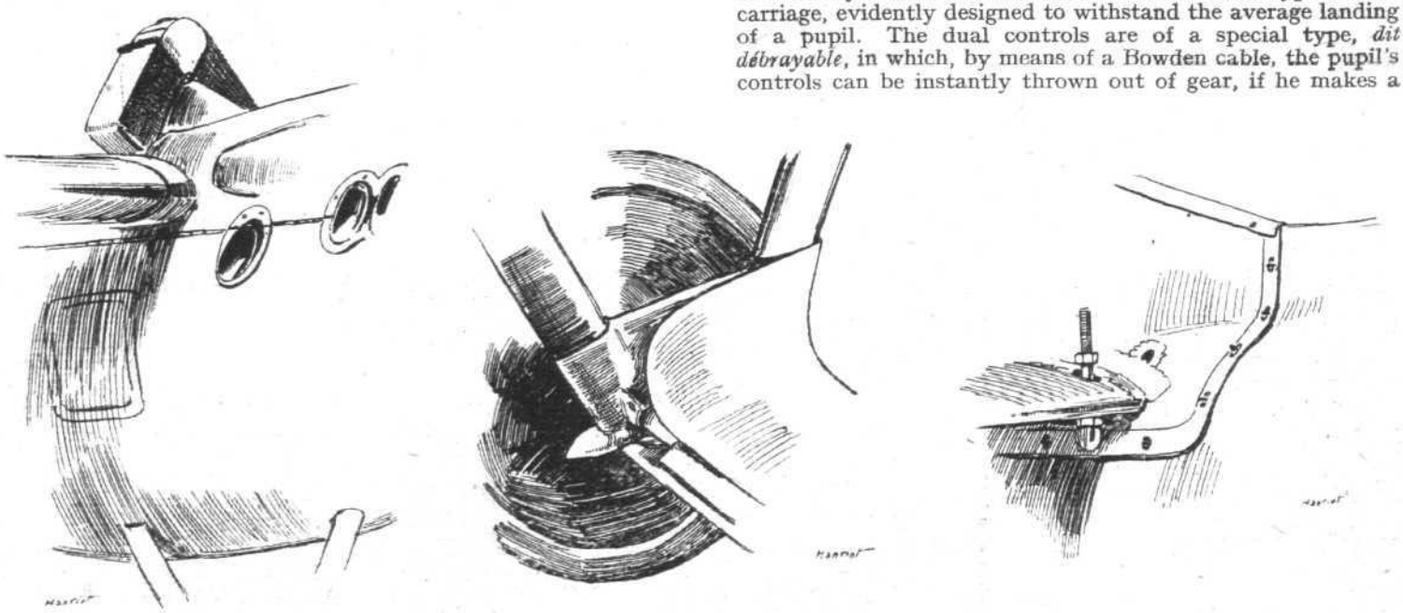
An undercarriage of the usual simple Vee type is fitted, and one confesses to a certain amount of disappointment at not seeing the retractable undercarriage which was contemplated for the actual Coupe Deutsch race. As exhibited the undercarriage showed few features of interest, beyond the fact that circular pieces of fabric had been doped on to the sides of the tyres, so as to streamline as far as possible both wheels and tyres. These patches covered the whole wheel, with the exception of the actual tread of the tyres.

The tail of the Hanriot racer is of ordinary type, but one noticed that the fin covering (of the upper fin) is a hollow shell of aluminium sheet, which appears held down to the *fuselage* by turn-buttons. Whether there are any internal attachments one is not able to say, but, if not, the attachment by means of turn-buttons does not appear any too secure. Where the lower edges of the fin cover overlap the top of the tail plane the joint is covered with a strip of fabric, doped on. Under the *fuselage* is an adjustable fin, which has a single pivot, and can be so set as to counteract the tendency to turn experienced when the engine is running "all out." The support of this fin does not look particularly substantial, but in view of the metal construction may be safe enough. Altogether the Hanriot monoplane is, in the main, a very fine piece of design, and the workmanship is excellent, especially as regards the various parts formed out of aluminium sheet by beating. The *ailerons* are covered with aluminium, and have their control tubes inside the wing.



The Hanriot Racer: View inside the cockpit, showing mounting of petrol tanks.

The second machine exhibited is a Hanriot school machine, type "H.D. 14," with dual controls. It is an ordinary tractor two-seater biplane, with 80 h.p. Le Rhône engine. It is chiefly remarkable for the four-wheeled skid type undercarriage, evidently designed to withstand the average landing of a pupil. The dual controls are of a special type, *dit débrayable*, in which, by means of a Bowden cable, the pupil's controls can be instantly thrown out of gear, if he makes a mistake. The details are quite simple, consisting of pins operated by the flexible cable, the withdrawal of which results in the sliding of the pupil's control lever and foot bar telescopically in their tubes without affecting the external portion of the controls. The arrangement is, we understand, the subject a Hanriot patent.



"Flight" Copyright

SOME DETAILS OF THE HANRIOT MONOPLANE RACER: The sketch on the left shows the mounting of the radiator above the *fuselage*. In the centre is part of the streamline undercarriage. The wheels have fabric discs doped on to cover all grooves, etc., except the tread of the tyre. The fin covering, shown on the right, is aluminium sheet, and is held on by turn-buttons.

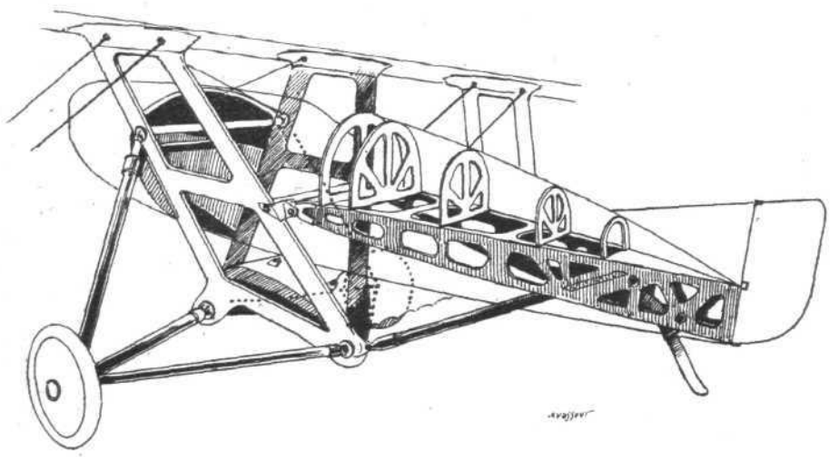
PIERRE LEVASSEUR
17 to 21, Place Felix-Faure, Paris (XVe)

FOR sheer excellence of workmanship and beauty of finish no stand can excel that of Pierre Levasseur, whose *Directeur*, M. Charles Fréchet, was attached to the British Air Ministry during the War. In addition to two aeroplanes, there are specimens of propeller work which are a joy to behold. One of the complete machines, shown in skeleton, is a torpedo-plane, and is very reminiscent of the Blackburn "Swift"—so much so that one wonders if, perchance, it should be built under licence. The front portion of its *fuselage* is a steel tube structure of very clean design and, needless to say, splendid workmanship. It detaches from the main *fuselage* structure as a complete unit, with its 600 h.p. Renault engine. The under-carriage is of the divided type, to allow of dropping the torpedo suspended between its two halves, and is also of steel, with rubber pads working in compression for its shock-absorbing gear. The rest of the machine is of usual wood and metal clip and wire construction, and is in every way up to the best of British practice.

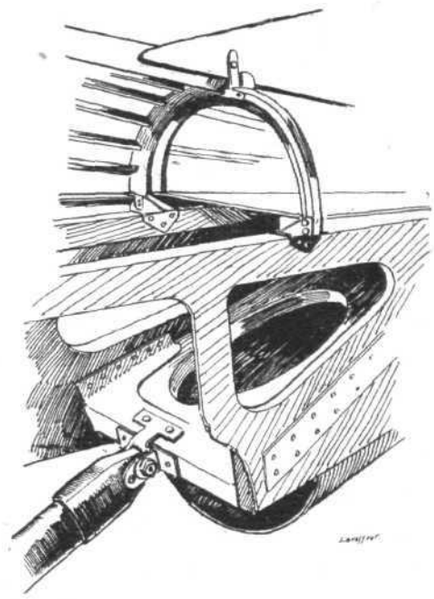
The other machine shown is a fairly small two-seater side-by-side biplane of very unorthodox, but eminently sensible, design. It is a serious attempt at introducing new methods of construction which shall be less costly in manufacture but equally serviceable in use to the methods ordinarily adopted. Once the peculiarity of the design has been grasped, and one has become accustomed to the somewhat unusual appearance, the machine impresses one as a very clever piece of design, and one which, unlike so many novelties which are merely freaks with nothing to recommend them, is likely to survive its first show appearance. The number of component parts has, it seems, been reduced to an absolute minimum, and the resulting structure certainly gives the impression of strength. That the object of the design—cheapness—has been achieved appears to be proved by the fact that one is informed the machine can be built for 13,000 francs without engine (about £520 at normal rate of exchange, and £250 at present).

One of the accompanying sketches, which is mainly diagrammatic, shows the fundamental principle of the design. The backbone of the machine is formed, it will be seen, by two Vees of ply-wood, to which are attached the few remaining structural members, such as the engine bearers, the tail outriggers, the main planes and the under-carriage. The whole is afterwards enclosed in a light streamline casing formed by formers, stringers and fabric. Nothing could be much simpler, and the reduction of parts to a minimum must save a tremendous amount of work in manufacture and erecting.

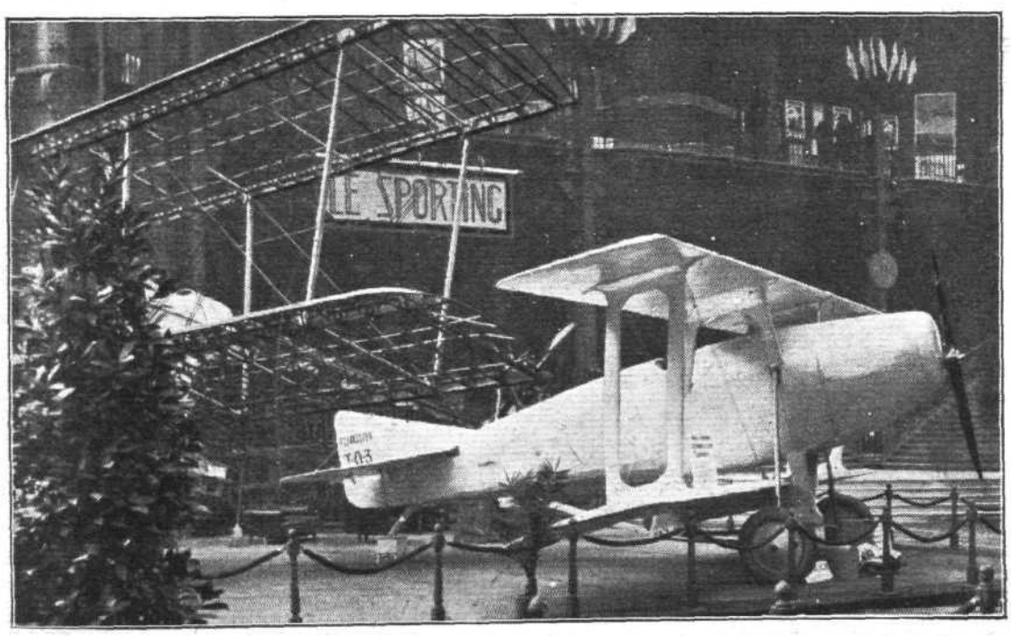
The engine, a 180 h.p. Hispano-Suiza, is mounted in the nose, on bearers extending forward from the Vees. The whole after portion of the *fuselage* structure is composed of two ply-wood members arranged in the shape of a wedge. These members, which are built up of 11 laminations and have



THE PIERRE LEVASSEUR SPORTS MODEL: This machine is of most unusual design, the general scheme being indicated in the drawing.



Attachment, on the Pierre Levasseur, of the single tubular strut which runs from the undercarriage Vee to the rear portion of the *fuselage*.



On the Pierre Levasseur Stand: On the left the skeleton of a torpedo 'plane, and on the right the side-by-side machine, which is of most unusual and rather clever design.

"Flight" Copyright

lightening holes cut in them, meet in a vertical knife-edge at the stern, and are attached with their front ends to the rear of the rear Vee. Compression tubes across the *fuselage* triangulate the lower portion of the angle between the Vees, the upper panel (in the front bay only) being braced by diagonal wires.

As already mentioned, the main planes attach to the feet and apex of the Vee. Both planes are straight, without dihedral, and are built up in one piece. The top plane bolts to the feet of the Vees by simple bolts, and the lower plane is slipped between the legs of the two Vees and attached to the longitudinal member by long bolts. The interplane struts are in the form of ply-wood rhomboids, and thus do away with incidence bracing. The wing bracing is of ordinary type, but it is not difficult to imagine the design carried a step further, using fairly thick high-lift wings and, possibly, strut bracing, thus doing away with all wires in the structure.

The under-carriage is entirely in steel tubing, and has two radius rods running from the apex of the Vees to the wheel, and a single telescopic tube from the wheel to the front of the Vees some distance up the side of the *fuselage*. A compression tube across the *fuselage* at this point relieves the Vees of all lateral load. The wheel track is wide, and it should be an easy matter to make the under-carriage as "squashy" as desired for school work or for amateur flying. Altogether the machine appears to have great possibilities, and when it is finished and tested we hope to be able to keep our readers informed of its future progress. The only data at present available are that the weight, "all-on," is 980 kilogrammes (2,160 lbs.) with pilot and passenger and four hours' fuel, and that the estimated speed is 112 m.p.h.

One of the propellers shown on this stand is a variable pitch screw which, at the opening of the exhibition, had just successfully passed its tests at the *Section Technique*. It has been run for many hours on end, and it was found possible to alter the pitch at all speeds with the greatest ease. We understand that one of the difficulties with former models was that up to 1,000 r.p.m. or so it was easy to change the pitch, but that at higher speeds it was found almost impossible, and that in order to change the pitch it was found necessary to throttle down. In the new propeller the pitch can be altered up to 1,800 r.p.m. This is mainly due to a much better balance, and the construction is also somewhat different from that of previous models. Briefly, the wood blades are now attached to the metal hub in such a manner that each lamination has its own bolt. The resulting strength has been found to be enormous, and it now really looks as if, after about ten years of experiment and the expenditure of a great deal of money, the Pierre Levasseur firm has produced a really satisfactory variable-pitch air-screw. It is now, we understand, intended to fit the propeller to a supercharged engine and to carry out experiment under actual flying conditions.

(To be continued.)

THE FORTHCOMING AIR CONFERENCE

THE Air Ministry announces that the first Air Conference proved so useful in focussing attention on the many and intricate problems of aviation and in bringing about a frank exchange of views on the subject, that the Air Council has decided to call together another Conference. This second air parliament will be held by permission of the Lord Mayor and Corporation at the Guildhall on February 7 and 8, 1922.

The conference, which will be opened by the Lord Mayor, will, on this occasion, be asked to address itself mainly to the question of the future of aviation, with special reference to its development as a regular and speedy form of commercial transport.

As a matter of convenience the papers will be divided into two main groups, the one dealing with civil aviation in general and the other with technical problems, the papers on the former subject being delivered at the morning session of the first day, and the papers on the latter during the afternoon session of the same day. The proceedings on the second day will be devoted wholly to discussions arising out of the previous day's papers, the morning session being allotted to civil aviation and the afternoon to discussions on the technical papers.

There will be two Chairmen: the Secretary of State for Air, who will preside during the civil aviation portion of the proceedings, and Lord Weir of Eastwood during the technical sessions.

The principal paper on civil aviation will be read by Lord Gorell, Under-Secretary of State for Air, who will give a general account of progress at home and abroad, and will direct attention to a consideration of the ways and means whereby the development of civil aviation at home and in the Empire may be best furthered. In this connection Lord Gorell will endeavour to enlist the practical co-operation of business and other interests.

The main technical paper will be read by Mr. F. M. Green, of Sir W. G. Armstrong, Whitworth Aircraft Limited; the names of the other speakers will be communicated later.

In order that the Conference may be fully representative of all sections of the community who are now interested in the development of aeronautics, or who are considered to have a potential and growing interest in air transport development, special invitations are being issued to all coming within these categories, particular efforts being made to secure so far as possible the attendance of representatives of large business groups and organisations.

Arrangements are being made which will permit of members of the Conference who desire to do so visiting the London terminal aerodrome at Croydon on Monday, February 6. The operations of the various Continental air transport companies will then be seen and explained; in addition, as many types of civil aircraft as possible will be concentrated at Croydon to afford members an opportunity of seeing for themselves the range which is being covered by commercial designs. Demonstrations of amphibian aircraft alighting on the Thames will also take place during the period of the Conference.

Aviation Finding a Home in Australia

THE Federal Government is carrying out its determination to utilise aircraft for long-distance postal and for limited passenger services, and the latest information upon this development comes from *The Times'* Melbourne correspondent. Tenders have been accepted for such services between Adelaide and Sydney, and again between Sydney and Brisbane, 750 and 575 miles respectively as the crow flies. By rail the distance from Adelaide to Brisbane is 1,800 miles, and occupies four days. The subsidy for the first section is £17,500 a year, and for the second £11,500.

Tenders are also being called for a service between Charlesville and Cloncurry, in Queensland, a distance of 575 miles, much of it over country which in the rainy season is practically impassable.

Recently an aviator arrived in the centre of Australia in comparatively few hours, covering a distance which occupies carters' wagons two months. Added to the service in West Australia, there will soon be 3,000 miles of postal and commercial aerial highways in constant operation. If the experiments are satisfactory, they will be extended and will solve one of the great communication problems of Australia.

On the other hand, the Federal Parliament has seen fit to reduce the Defence estimates by £100,000, which means the practical abandonment by the Government of the air scheme outlined earlier in the year. The two squadrons of flying boats have both been abandoned, and the two seaplane squadrons, one active and one reserve, modified to six machines, three active and three reserve. The scheme now amounts to the carrying on with what is possessed at the present time, with the addition of several Avros ordered at a local factory.

Irish Free State and Aviation.

IT is to be noted that in the peace terms with the new Irish Free State provision is made by the British Government for "Facilities in the neighbourhood of the above Ports (Berehaven, Queenstown Belfast Lough, and Lough Swilly) for Coastal Defence by Air," and further, that "A Convention shall be made between the same Governments for the regulation of Civil Communication by Air."

American Navy to test Dornier boat.

IT has been the policy of the American Navy Department to purchase abroad examples of metal construction in order to study the latest developments. Among the machines to be demonstrated is a Dornier metal flying boat, which will be flown during a special demonstration at the Naval Aircraft Factory at Philadelphia. A number of engineers from the aircraft trade have been invited.

FLIGHT

THE SECOND CZECH INTERNATIONAL AERO EXHIBITION

THAT the Czechoslovak Republic is taking up the development of aviation very seriously is demonstrated by the success of the Second Czech International Aero Exhibition, which was held at Prague from October 22nd to October 30 last, under the patronage of the President, Dr. T. G. Masaryk. Although foreign exhibitors participated, these were considerably outnumbered by those of the "Home-grown" variety—in itself a promising sign. It was noticeable, also, in respect to the Czech section, that there was a marked general improvement on the exhibits shown at last year's exhibition.

The exhibition, which was held in the Industrial Palace, was organised by the Czechoslovak Aviation Club, and there was no lack of assistance and encouragement from the Czech Government. In fact, the official aerial policy is very largely responsible for the progress aviation has made during the past few years in this new Republic.

We give below a few brief particulars of the principal exhibits of aeroplanes and engines. The "Aero" Aircraft Works of Prague exhibited three machines of the chaser type—the "Ae.O. 2," the "Ae.O. 3," and the "Ae.O. 4." The former is a single-seater chaser biplane, designed by MM. Husnik and Vlasak, fitted with a 220 h.p. Hispano-Suiza. It is, we believe, mainly of metal construction, and is similar to the "Ae. 2. 01," described in FLIGHT for May 26 last. The "Ae.O. 3" is also a chaser biplane, fitted with a Hispano-Suiza, but designed by Engineer Rösner. Instead of the single struts each side, employed in the "Ae.O. 2," this machine is fitted with V-struts. The "Ae.O. 4," is another Husnik-Vlasak design, a single-seater chaser biplane, somewhat "stumpy" in appearance, but having a very good performance nevertheless. It is fitted with a B.M.W. engine of 185 h.p., and is claimed to have a speed of 136 m.p.h. The planes are separated by a single I-strut each side.

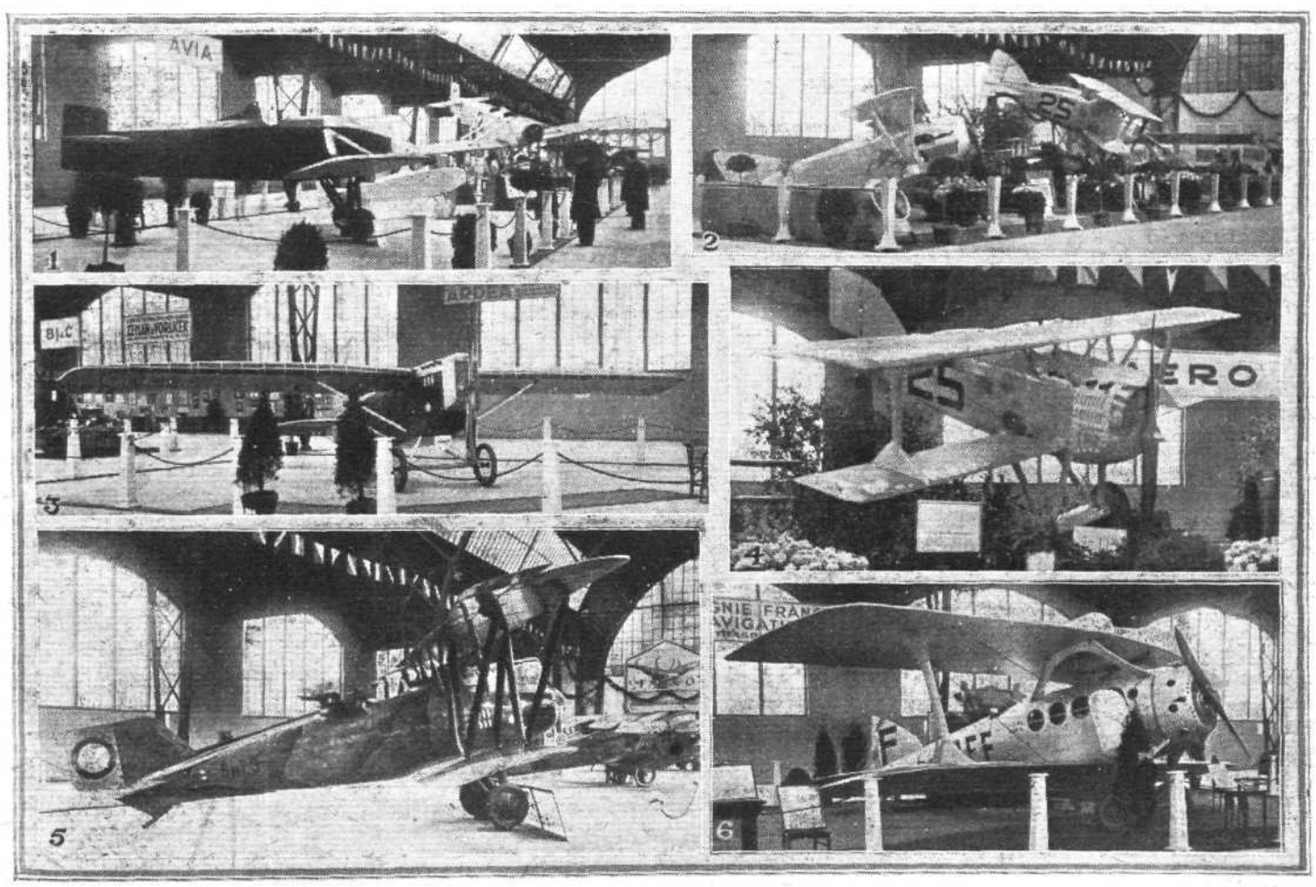
Three interesting machines were also shown by the Avia Works, of Prague. These machines are "semi-cantilever" monoplanes, and are evidently the results of the experiments obtained with the Avia 35 h.p. "B.H. Exp." built last year, and described in FLIGHT for April 21, last. MM. P. Benes and Hajn are responsible for the designs, as before. The Avia "B.H. 1," is similar to the experimental machine referred to above, but it is fitted with a 48 h.p. Gnome engine, and is intended as a two-seater sporting model. The Avia "B.H. 2" is another sporting model, of exceptionally small proportions, for a 20 h.p. engine. The third machine, the "B.H. 3," is a single-seater chaser, of similar design, fitted with a 185 h.p. B.M.W. engine. In each case, it will be noticed, the wings are mounted at the bottom of the *fuselage*, and braced by struts from the top of the latter. The wings are of thick tapering section, having a maximum thickness at the point of attachment of the bracing struts, and tapering towards both root and tip.

The "Ardea" factory exhibited a neat-looking school monoplane, also of the "semi-cantilever" type, but in this case the wings, whilst similar in form to those employed on the Avia "B.H." machines, are mounted at the top of the *fuselage*, and are braced to the latter from below. It is designed by MM. Blecha and Prikryl, and is fitted with a 70 h.p. Mercédès engine.

A two-seater fighting biplane, the "Sm. 2," was exhibited by the Military Aircraft Works of Prague-Gbely. This machine, which is designed by M. Smolik, has a well-streamlined *fuselage*, apparently of plywood construction, and is fitted with a 260 h.p. Maybach engine. Warren type interplane struts are employed for the wing bracing.

A Blériot-Spad Berline, as employed on the Paris–Strassbourg–Prague–Warsaw Air service, was exhibited by the Compagnie Franco-Roumaine de Navigation Aérienne.

The Fiat-Co. of Turin exhibited two of their aero engines, a 9-cylinder 300 h.p. radial, and a 400 h.p. 8-cylinder V.



THE SECOND CZECH INTERNATIONAL AERO EXHIBITION AT PRAGUE: 1. The "Avia" exhibits, that in the foreground being the B.H.3, a chaser monoplane fitted with a B.M.W. 185 h.p. engine; in the centre is a smaller edition for a 20 h.p. engine; the third machine is a sporting 2-seater with a 48 h.p. Gnome. 2. Three "Aero" Aircraft Works exhibits—the "Ae.O.3" (Hispano-Suiza), the "Ae.O.4" (185 h.p. B.M.W.), and the "Ae.O.2" (220 h.p. Hispano-Suiza). 3. The "Ardea" School monoplane (70 h.p. Mercédès). 4. A close-up view of the "Ae.O.4." 5. The Military Aircraft Works 2-seater fighting "Sm.2" (260 h.p. Maybach). 6. A Blériot-Spad Limousine, exhibited by the Compagnie Franco-Roumaine de Navigation Aérienne.

A NEW SILENCER FOR AERO ENGINES

The Birger "Ad Astra"

FOR some months past there have been rumours of a new Swiss silencer for aero engines, which was said to have given excellent results, both as regards silencing the engine and also from the point of view of absorbing little power. This silencer is now being introduced in this country by Sir William Maxwell, K.B.E., of 6, Broad Street Place, London, E.C. Sir William, it may be mentioned, is one of the directors of Titanine, Ltd., the well-known dope manufacturers of Empire House, 175, Piccadilly. The new silencer, which was put through preliminary tests at the R.A.E., Farnborough, is the invention of M. J. Birger, a Swiss engineer, and was demonstrated at Stag Lane aerodrome last week. Fitted to a D.H.9C, with Siddeley "Puma" engine, the "Ad Astra" silencer proved remarkably efficient as regards its silencing properties, and one can well believe the various technical reports which state that conversation between pilot and passenger is easily possible at full throttle. Personally we were unable to test this, as a thick fog prevented flying on the day of our visit to Stag Lane, but a run on the ground, although not a fair test on account of the fact that the silencing is then less complete, indicated that in this respect the new silencer is very effective. The demonstrations were witnessed by representatives of several aero engine firms. M. Birger was there to give any technical information desired, Mr. Ortweiler, of Aerial Derby fame, acting in the dual capacity of interpreter and pilot.

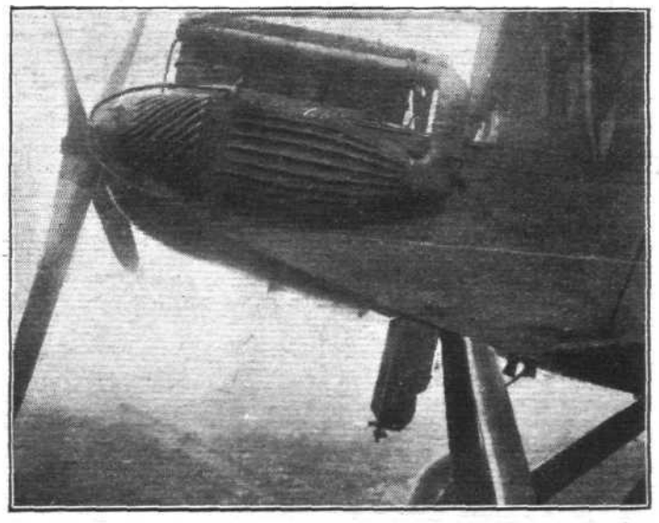
As, at the moment, no sectional drawings of the "Ad Astra" silencer are available, it is a matter of some difficulty to do more than indicate the general principles upon which the silencer is designed. It consists, essentially, of two portions, a fixed silencer in which the exhaust gases are made to follow a zig-zag path, and a rotor in which the gases are cooled before being allowed to escape into the air.

The exact details of the silencer are not definitely known, but generally speaking they do not differ greatly from those in use on motor-cars. The collector pipe from the cylinders leads the gases into the rear end of the silencer body, and one gathers that the usual perforated plates and deflectors are fitted, which reduce to a certain extent the velocity of the exhaust gases. The latter are finally allowed to escape through the front of the silencer into a streamline nose-piece which is rotated rapidly by the slip stream of the propeller. This rotor, which runs on ball bearings, has an aluminium covering with spiral corrugations, and is, moreover, provided with internal blades, running, one gathers, radially from the central spindle. These blades act in a certain measure as a fan, but their main function is to throw the gases out against the rotor covering by centrifugal force. The covering being of aluminium, and therefore a good conductor of heat, the gases are cooled rapidly and consequently contract, and it is claimed that this feature not only decreases back pressure, but actually slightly increases the power.

We have had the privilege of reading extracts from a report on tests on one of these silencers at the Swiss Federal Aerodrome at Dubendorf, where a comparison was made between the engine running with free exhaust and with the "Ad Astra" silencer. On these tests it was found that there was no loss of power (this was confirmed at Stag Lane, where the number of revolutions was the same when the silencer was cut out as when it was working) and that there was a saving of 4½ to 5 per cent. in fuel consumption. It is thought that with an improved type (the one under tests is stated to have been of fairly primitive construction) a saving in fuel of about 8 per cent. may be effected. It was also found that, although a smaller quantity of cooling water was used, the temperature was lower when running with the silencer than when running with free exhaust. When the engine was examined after the tests it was found that the sparking plugs and valves were remarkably clean.

The silencer fitted to the D.H.9 for the demonstration weighs, we understand, 22 kilograms, but as it is designed for a higher-powered engine the weight, it is claimed, can be materially reduced. As regards head resistance, we are informed that this is equivalent, for the silencer shown, to that of a flat disc of 12 cm. diameter. The question of resistance is, as M. Birger points out, to a great extent a question of choosing a good streamline shape.

As regards the adaptability of the "Ad Astra silencer" to different types of engines, the inventor claims that there is no difficulty about the Vee type, and that the silencer can be placed in any desired position. In the case of a Vee it would probably be placed above the engine, between the two rows of cylinders, although it would have to be placed so high that the exhaust gases could escape over the top plane of a biplane. Fitting it to a "broad arrow" type might be a matter of greater difficulty, although in that case there would presumably have to be a larger silencer serving two banks of cylinders and a smaller on the opposite side serving a single row. It cannot be said that the "Ad Astra" increases the good appearance of a machine, but if all the claims made for it can be substantiated this is a matter of small importance. The addition of about 0·1 lb. weight per h.p. of the engine, and a small increase in the resistance of the aeroplane, is a small price to pay for engine silence, especially when, as is claimed in this case, this is accompanied by a saving in fuel, and greater cleanliness of plugs and valves.



THE "AD ASTRA" SILENCER: View of the apparatus fitted experimentally to a Siddeley "Puma" engine on a D.H.9 biplane.

LONDON TERMINAL AERODROME

Monday Evening, December 5

BAD flying weather has interfered again with the regularity of the London-Paris service. Several days last week were blank from an air transport point of view, and today there was again no flying owing to dense fog on the coast.

On Tuesday Mr. Uwins arrived on the Bristol 10-seater, *en route* from Bristol to Martlesham. The double undercarriage has been replaced by one of the single Oleo type, and the engine-starter has been removed. With these alterations, I understand that the tests at Martlesham were very satisfactory. With a load of 12 passengers and 200 pounds of goods, and with full tanks, the machine got off the ground in 180 yards, a testimonial to the reserve of power in the Napier "Lion" engine. With the same load the machine cruised comfortably at 100 miles an hour.

"Ferry" Fees for Pilots.

APROPOS my remarks last week as to the price paid aviators for delivering aeroplanes to Brussels for the Disposal Co., I understand that this has now been increased, so that the pilot makes at least £8 8s. on the trip. Rumours to the effect that one pilot took over a machine at the old price while negotiations were proceeding is, I am given to understand, incorrect, the pilot having been promised the rate which was decided upon when negotiations were completed.

The staff of the Disposal Co. are holding a competition in connection with the dressing of dolls, prizes being offered for the best-dressed dolls in different classes. In one class, for instance, the doll must not cost more than twopence, it being the ingenuity in the dressing that counts. No entrance fee is charged, and the competition is open to

everybody. The whole idea of the scheme is to provide poor children in hospitals with a Christmas present, and to this end all dolls entered in the competition will be used.

'Drome Officials to Dine Together

ON Monday next, December 12, the first annual dinner of the various staffs at the aerodrome will be held at the Café Royal, Croydon. The function, arranged by Mr. Coleman, who is in charge of the traffic hands, promises to be extremely popular. Already over 80 tickets have been sold, and it is hoped to make the gathering an annual one. A smoking concert, under the management of Mr. Thompson, of the Duty Office, is to follow the dinner, the provisional programme consisting of eighteen items of an extremely interesting and varied character.

Friday saw the arrival of one of the Fokker monoplanes piloted by Mr. Hofstra. This was a "special" hired in Amsterdam to bring over one passenger. It went back on Saturday, and, in the meantime, a partial load of goods had been collected for the return journey.

Messageries Aériennes are accepting goods for Amsterdam, conveyance being *via* Paris. There is, perhaps, something to be said for this idea from the view-point of keeping in touch with clients during the time the K.L.M. are not operating: but, on the other hand, there is sometimes great delay owing to weather, and owing also to the fact that goods are often delayed for a night in Paris. Such delays are not to the credit of air transport; but I am informed that many people send parcels by "airway" not so much for the speed, but because of the careful handling which is given air-borne goods.

A new boiler-house has been built at the side of the sheds. This is to supply hot water for filling the radiators of the engines, and it has already proved its value during the recent cold spell.

One of the French pilots has brought news to the aerodrome of the latest trial which has befallen those connected with the Fokker monoplane exhibited at the Paris Aero Show. It appears that after the 'plane had been seized as infringing French "joy-stick" patents, Mynheer Fokker managed to overcome this difficulty, and regained possesion of his machine. Mr. Hinchcliffe, chief pilot of the K.L.M., then arrived at Le Bourget to fly it back to Amsterdam, and, on ascending, gave a fine performance of "aerobatics," evidently with the idea of showing French officials what the monoplane could do. Such trick flying is, however, contrary to all the regulations at Le Bourget, where stunting is taboo, and Mr. Hinchcliffe now finds himself the unfortunate possessor of a number of summonses for contravening French air laws.

R.A.F. Sports Board

THE Royal Air Sports Board has just been reconstituted, with Air-Commodore C. L. Lambe, the old United Services and Blackheath Rugby player, as Chairman, assisted by Air Vice-Marshal Sir J. M. Salmond, commanding the Inland Area; Air Vice-Marshal A. V. Vyvyan, commanding the Coastal Area; Air-Commodore C. A. H. Longcroft, commanding the R.A.F. at Cranwell; and Air-Commodore F. R. Scarlett, commanding the R.A.F. at Halton; while the secretarial work will be undertaken by Flying Officer D. F. Cox, of the Air Ministry.

For some time it has been felt that the Force, with its 3,000 officers and 26,000 airmen (including boys), should have sports organised on a thoroughly sound basis, and Rugby and Association football, cricket, hockey, athletics and cross-country, boxing, fencing, lawn tennis and golf are now provided for. Each will be controlled so far as details are concerned by its own committee, though questions of policy will be decided by the Sports Board. It is not the ambition of the Force to win inter-Service matches straightway, the intention at present being more or less to concentrate on inter-team and inter-unit contests, though the possibility of meeting the Royal Navy and the Army on level terms in the future has not been overlooked.

The respective secretarial duties are being undertaken as follows:—

Rugby Football.—Flight-Lieut. W. W. Wakefield (Pembroke College, Cambridge).

Association Football and Athletics.—Flying Officer A. J. Adams (R.A.F. Depôt, Uxbridge).

Cricket.—Group-Capt. M. J. Roche (Coastal Area H.Q.).

Hockey.—Flight-Lieut. D. K. Cameron (Coastal Area H.Q.).

Boxing and Fencing.—Flight-Lieut. F. G. Sherriff (R.A.F. Depôt, Uxbridge).

Lawn Tennis.—Sqdn.-Ldr. W. G. P. Young (Air Ministry, Kingsway, W.C. 2).

Golf.—Flight-Lieut. C. H. Hayward (R.A.F. Depôt, Uxbridge).

R.A.F. Sports Fixtures for December

DECEMBER 3, R.A.F. Cadet College *v.* R.M.C. (Rugby), at Sandhurst; 7th and 8th, Wakefield Competition (Boxing), at Halton; 9th, R.A.F. *v.* Birmingham Athletic Club (Fencing), at Birmingham; 14th, R.A.F. *v.* Royal Navy (Fencing), at Portsmouth; 17th, R.A.F. (Cadet) College *v.* R.M.A. (Rugby), at Cranwell; 19th, R.A.F. Trial Match (Rugby), at Uxbridge; 24th, R.A.F. *v.* Leicester (Rugby), at Leicester; 26th, R.A.F. *v.* Harlequins (Rugby), at Queen's Club.

R.A.F. Hockey Association

THE draw for the first round of the R.A.F. Inter-unit Hockey Competition is as follows:—

No. 1 District.—Gosport *v.* Calshot, Winchester *v.* Upavon, Netheravon *v.* Andover, Lee-on-Solent a bye.

No. 2 District.—Martlesham *v.* Burcham Newton, Leuchars *v.* Spittlegate, Cranwell *v.* Shotwick.

No. 3 District.—Halton *v.* Manston, Uxbridge *v.* Grain, Henlow *v.* Ruislip

THE LONDON-CONTINENTAL SERVICES

FLIGHTS BETWEEN NOVEMBER 27 AND DECEMBER 3, INCLUSIVE

Route‡	No. of flights*	No. of passengers	No. of flights carrying: Mails	No. of flights carrying: Goods	No. of journeys completed†	Average flying time (h m)	Fastest time made by	Type and (in brackets) Number of each type flying
Croydon-Paris	12	15	4	10	7	2 54	D.H.18 G-EARO(2h. 32m.)...	B. (2), D.H.18 (2), G.(3), H.P. (1), Sp. (2).
Paris-Croydon	9	17	3	8	6	2 27	Goliath F-ADDT (1h. 57m.)	B. (1), D.H. 18 (1), G. (2), Sp. (3), V. (1).
Totals for week ...	21§	32	7	18	13			

* Not including "private" flights. † Including certain journeys when stops were made *en route*.
‡ Including certain diverted journeys.
§ A journey between Croydon–Rotterdam (goods), and between Amsterdam–Croydon (1 pass.) were also made.

Av. = Avro. **B.** = Breguet. **Br.** = Bristol. **Bt.** = B.A.T. **D.H.4** = De Havilland 4, **D.H.9** (etc.).
F. = Fokker. **Fa.** = Farman F.50. **G.** = Goliath Farman. **H.P.** = Handley Page. **M.** = Martinsyde. **N.** = Nieuport.
P. = Potez. **R.** = Rumpler. **Sa.** = Salmson. **Se.** = S.E.5. **Sp.** = Spad. **V.** = Vickers Vimy. **W.** = Westland.

The following is a list of firms running services between London and Paris, Brussels, etc., etc.:—Co. des Grandes **Expresses Aériennes; Handley Page Transport, Ltd.; Instone Air Line; Koninklijkie Luchtvaart Maatschappij;** Messageries **Aériennes; Syndicat National pour l'Étude des Transports Aériens; Co. Transaérienne.**

THE PRESENT STATE OF AIRSHIP DEVELOPMENT*

By Major G. H. SCOTT, C.B.E., A.F.C.

IN his introduction Major Scott stated that, in his opinion, if air transport is to take its place with other existing forms of transport, the long-distance routes of the world must be established. In considering the present state of technical development it is possible to deal with each of the individual parts separately under the following headings: hull, fabric, engines, safety, handling on the ground, handling in the air, navigation and wireless.

Under the first heading the lecturer dealt with the general construction of airship hulls, and pointed out how construction, especially as regards external and internal keels, has altered since the early days. The first stream-line airship was the Schütte-Lanz, which was introduced as early as 1909, and which had a fineness ratio of 7·1 to 1, as compared with 9 to 1 for the contemporary Zeppelins. The reduction in fineness ratio reached its limit in the German commercial airship "Bodensee," with a ratio of 6·5 to 1. This ship had a speed of 81·2 miles per hour. With the introduction of larger diameter airships it was found that the stresses in the radial wires became excessive from the end pressure of the gas bags. To release this tension in radial wires an axial wire was introduced. This wire runs longitudinally through the centre of the ship. Shear wires were also introduced leading from the top of one main transverse frame through the gasbag to the keel at the foot of the adjacent frame. In the earlier ships fins, rudders and elevators were of the box type. These were superseded later by the simple fin, but as the speed of the ships increased the resistance of this type of fin became excessive owing to the large amount of external wiring, and in 1918 streamlined or cantilever fins were introduced. "This," the lecturer said, "brings the British airship up to the "R.36" class, which can be taken as a thoroughly proved design, embodying no experimental features. Her dimensions, etc., are:—

"Length, 672·2 ft.; diameter, 78·75 ft; capacity, 2,101,000 cubic ft.; gross lift, 63·8 tons; useful lift, 23·5 tons; horse-power, 1,570; full speed, 56 knots; cruising speed, 45 knots."

As regards gasbags, Major Scott stated that Germany has proved one step ahead of this country by the introduction of 15-metre gasbags instead of 10-metres, as in British and previous German airships. These 15-metre gasbags were employed in all ships of the "L.60" class, and in the "L.71" and "L.72," and proved satisfactory. The wider spacing of the main transverse frames caused vibration of the keel, and stirrup wires were introduced. These lead from the top of the main transverse frames through the gasbags on to the corridor midway between main transverse frames, supporting the corridor at this point.

"The next step taken by this country," the lecturer said, "was the construction of 'R.38,' which embodied the 15-metre gasbags, but omitted stirrup wires. Other new features introduced were:—Increased diameter from 80 ft. to 85·6 ft. Modified form of corridor, the old triangular form being superseded by a four-sided section. New method of gasbag wiring, the nets and diamond form of gasbag wiring being replaced by circumferential wires, running parallel about 9 ins. apart right round the ship. The lift of the gas is taken by these wires, and is transmitted from them to the main transverse frames by catenary wire, a new feature of this design. Larger petrol tanks were introduced in order to concentrate the loads at the main frames. Previous tanks were of 80 gallons capacity, and the new 'R.38' tanks were of 160 gallons capacity. A modified form of balanced rudder and elevator were also introduced.

"As stated in the report of the Court of Inquiry, 'R.38' was wrecked due to structural failure in the air. A careful investigation into the causes of this failure is at present being undertaken by the Accidents Investigation Sub-Committee of the Aeronautical Research Committee. I am not at liberty to make any statement at present. Some of the features introduced into 'R.38' are no doubt sound, and it must be realised that 'R.38' was designed for a very special performance, and the trials indicated that this performance would have been realised.

"Summarising, there is in existence today an airship of the 'R.36' type, proved and tried out, with a performance as stated earlier. Also it would be possible to build an airship of 2,500,000 cubic ft. capacity without embodying any new features that have not already been tried out and proved in this country or in Germany."

The lecturer then dealt with the question of fabric, and permeability, relating to the development of gasbag construction from the early German cotton rubber-proofed bags, to the modern version where fabric in conjunction with gold-beater's skin is used. He pointed out that sticking gold-beater's skin to the fabric with rubber is not a good method for ships to be used in tropical or semi-tropical conditions, but that the employment of gelatine glue appears to be satisfactory. He finally mentioned that in view of the enormous number of skins required (over 300,000 in the case of a ship such as 'R.36'), the question of a substitute is of importance, and that a good deal of work has been done on synthetic substitutes for gold beater's skins, which is very promising.

On the question of airship engines, Major Scott stated that the requirements are entirely different from those of an aeroplane engine, and that we have not yet in this country a British engine specially designed for airship work. The only engine designed to meet airship requirements is the German Maybach. Whereas the average requirement of an aeroplane engine is a few minutes at full power, followed by some five or six hours at about three-quarter power, the airship requirements are more exacting. For commercial ships, the average duration will be about 50 hours, and the engine will be required to develop three-quarter full power, with occasional stops, for the full period, or to develop full power for three-quarters of this period. The modern airship starts its journey with about 20 lbs. of fuel for every rated horse-power, while the corresponding figure for aeroplanes does not often exceed 5. Thus a 10 per cent. increase in fuel economy under working conditions is equivalent to about 2 lbs. weight per horse-power in the engine. An engine designed for airship work may, therefore, have a higher weight per horse-power, provided there is a corresponding decrease in consumption, and such an engine running at lower revolutions, would be more reliable and have a longer life.

With reference to the question of economising fuel, Major Scott stated that until recently no satisfactory manner of burning hydrogen and petrol mixed had been devised, but that recent experiments have indicated a method of doing so which should greatly increase the performances of the airship in the future. The use of kerosene or crude oil instead of petrol would decrease the danger of fire, and he thought that the development of their use could be confidently predicted once the demand is realised.

Regarding propellers, Major Scott gave a brief history of the development of the placing of these, beginning with the earlier types in which the propellers were placed on brackets attached to the hull and driven by gearing, and leading up to the modern practice of direct-driven propellers placed at the rear of a comparatively small power car.

Turning his attention to the question of safety, the lecturer pointed out that the danger to a modern airship must be considered under two headings, dangers due to fire and dangers due to weather conditions. The former may be sub-divided into the danger due to petrol fuel, and that due to hydrogen. While admitting that there is a certain amount of danger due to petrol, Major Scott pointed out that this is no more serious than that due to the same cause in an aeroplane, and that danger of hydrogen is much less serious than that of petrol. "In all cases of fire in rigid airships," he said, "the ignition of the hydrogen has been a secondary cause."

As regards danger from weather conditions, Major Scott said that a hull of 2½ million cubic ft. could be built today with the same factor of safety as "R.33" and "R.34," which ships have safely weathered the worst conditions in the air. "The chief danger in an electrical disturbance is not," the lecturer pointed out, "due to lightning, as is generally thought, but to the very violent air currents which throw excessive strains on the hull structure." It is, however, comparatively easy to avoid thunderstorms, and Major Scott stated that he could say definitely that thunderstorms in this country do not constitute a danger to airships, nor will they do so in the tropics when the meteorological organisation has been extended to meet the comparatively simple requirements.

The limiting factor in the usefulness of an airship has, until comparatively recently, been the handling of the airship on the ground. An airship operating from a shed is handicapped by not being able to leave its shed except in moderate winds. Experiments with mooring masts have given excellent results, which were summarised as follows by Major Scott:—

"It was proved that an airship could remain at a mooring

* Extracts of a paper read before the Royal Aeronautical Society on December 1, 1921.

mast, comfortably, in winds up to 60 m.p.h., riding through hail and snow squalls. It was demonstrated that a ship could, with ease, leave a mast in a 40 m.p.h. wind. It was demonstrated that a ship could land at a mast in winds up to 32 m.p.h. It was shown that necessary running repairs could be undertaken on a ship at the mast with safety. It was shown that the hull deterioration, at a mast, is not heavy, the outer cover and gasbags were not so satisfactory: but as a result of sample tests carried out in Egypt, I think we can confidently say that the cure for this trouble is well in sight."

The mooring mast considerably increases the value of an airship where used for naval or for commercial purposes, as the airship can leave the mast regularly at schedule time in the case of the commercial ship, and can slip its moorings in any weather at short notice where it is a question of taking part in some naval operation. Furthermore, the number of men required to handle an airship is reduced, by the use of a mooring mast, from 300-400 to about 10.

On the subject of handling airships in the air, Maj. Scott pointed out that in most modern airships the engine cars are so arranged as to have one power car on the centre line right aft, and that this is better than a pair of cars aft, as in "R.80" and "R.38," as it gives better control at low speeds, owing to the slip stream acting on the rudder. Thus in the "R.33" class it is possible, he said, to swing the ship about on her rudder without losing or gaining ground, by running ahead on the after car and astern on the two wing units. The lecturer also referred to the increase in speed with size of ship, and to the effects of superheating.

Regarding navigation, Maj. Scott stated that the general degree of accuracy that can be obtained is such that under most conditions the true position can be estimated to within 30 miles.

In conclusion the lecturer summarised the technical position of the airship today as follows:—

"An airship of 2,500,000 cubic ft. (75 tons) can be built without introducing any experimental and untried features. The hull would last, in continuous service, for at least five years, and would have a useful lift for freight of 12 tons (passengers 5 tons, mail, etc., 7 tons) for non-stop journeys of 2,400 miles, *i.e.*, England to Egypt. A journey of this distance could be completed in 48 hours or at a speed made good of 50 m.p.h.

"The ship would be of a rugged construction, built for long life and low maintenance cost, and with a factor of safety at least equal to the 'R.33' and 'R.34,'" which ships, as you know, have shown themselves capable of standing up to the worst weather conditions, both in flight and at the mooring mast. The ship could be operated to meet commercial requirements, that is to say, arrivals to and departures from a mooring mast could be made to scheduled times and regularity on passage equal to that of steamships would be possible.

"In regard to future development, those actually in sight not only considerably improve the performance I have taken above, but also materially reduce the present cost of manufacture and operation.

"Finally, I would like to emphasise three further points which appear to me most important:—(1) An investigation into the present commercial requirements on Imperial routes indicates that some 5 or 6 tons of mail and freight and 30 to 40 passengers would be available weekly. (2) The performance of the commercial airship which could be built today, and which I have given, would meet these requirements. (3) The urgent need for speeding up Imperial communications is acknowledged by every one throughout the Empire, and an examination of the possible means by which this demand could be adequately met, with due regard to cost, points, in my opinion, to the use of the airship.

"As a point of interest, I would like to mention that from recent publications in Germany, it is quite clear that a considerably more optimistic view is taken in that country both as regards the present technical position of the airship and its future possibilities than that which I have given in this paper."

THE AIR MINISTRY SAFETY TANK COMPETITION

Tests Commenced on December 5

IN our issue of August 25, we published the announcement of a competition arranged by the Air Ministry in order to encourage the production of a fuel tank which should be safe and reliable for service and commercial purposes. The prizes offered aggregate £2,000, allotted as follows: First prize, £1,400; second prize, £400; third prize, £200. The competition, which commenced at the Royal Aircraft Establishment, Farnborough, on Monday, December 5, and which will continue on alternate days until the tests have been completed, is open to the world, and has brought in 26 entries, of which 19 are from Great Britain, 3 from France, and one each from America, Belgium, Italy and Japan.

The Judges Committee is composed as follows: Wing-Commander E. F. Briggs, O.B.E., D.S.O., Deputy Director of Research (Design), Major J. H. Ledeboer, M.B.E. (Research Department), Major B. C. Carter, D.I.O., A.R.C.Sc. (Research Department), Mr. C. G. B. Cockburn, O.B.E. (Accidents Investigation Branch), Major J. P. C. Cooper (A.I.B.), and Mr. H. H. Weight Vowden (Assistant).

As the rules for the competition have already been published in full (in our issue of August 25, 1921), there is no necessity to do more than mention a few of the most important points. Tanks should be so constructed as to prevent so far as possible leakage or ignition of the fuel when subject to stresses similar to those to which the tank would be subjected in a crash. Also, they should, if possible, prevent leakage and fire when subject to machine gun fire, using incendiary, armour-piercing, or explosive ammunition. The maximum weight, which would only be justified by very exceptional qualities, should not exceed 1·75 lbs. per gallon capacity, complete with fittings.

The relative importance of other characteristics will be considered in the following order of merit: Light weight; durability under service conditions; indifference to extremes of temperature; adaptability of design to large capacities; simplicity of construction; adaptability of design to various shapes; accessibility of fittings; cost of production.

As to the actual tests, these will consist chiefly of crashing tests and firing tests with machine guns. In the former tests, each tank will be mounted in a wooden structure, and will be located behind a dummy engine made of concrete. The tank will be released down a guideway, approximately 100 ft. high, so arranged that the structure will strike the ground at an angle of not less than 45 degrees from the horizontal, and will be free to turn over, imitating as far as possible the conditions prevailing in a typical aircraft crash.

In the firing tests the tanks will be subject to machine gun fire with ammunition capable of penetrating the ordinary type of mild steel fuel tank, exploding and igniting the fuel either on contact or after penetration. A series of bursts of five rounds each will be fired at a range of 50 yards, the tank being examined after each burst. The angle of fire will be at the discretion of the judges.

On the first day of the competition (December 5) three firms competed in the shock tests. These were Beasley-Sims and Morris of Birmingham, John Gibson of Edinburgh, and Pramson of Gironde, France. The Air Ministry does not wish any comments made upon the condition of the tanks until the end of the competition, when a full official report will be published.

Relinquishment of R.A.F. Station

THE land and buildings comprising the R.A.F. station at Coal Aston have been passed to the Disposal and Liquidation Commission, for disposal.

Royal Air Force Pageant, 1921

THE Royal Air Force Pageant Committee wish to announce that as a result of the Royal Air Force Pageant held at Hendon on July 2, 1921, the sum of £8,274 17*s.* 2*d.* was handed over to the Royal Air Force Memorial Fund, in aid of which the Pageant was held. This is an increase of £1,545 11*s.* 10*d.* over last year's balance.

France-Morocco Air Mail Service

THE Postmaster-General announces that in consequence of an alteration in the time of departure of the aeroplanes from Toulouse it is now possible to post up to 6.30 a.m. (printed papers 6.0 a.m.) at the General Post Office, London, on Monday, Tuesday, Thursday and Saturday, to connect with the air mails for Morocco which leave Toulouse on Tuesday, Wednesday, Friday and Sunday respectively. The mails are due to reach Casablanca on the following day in each case. Postal packets sent by this route on any day of the week will be greatly accelerated.

THE ROYAL AIR FORCE

London Gazette, November 29

General Duties Branch

Flying Offr. R. B. Luard is granted a perm. commn., retaining his present substantive rank and sen.; March 31. *Gazette* March 29, appointing him to a short service commn., is cancelled.

The following are granted short service commns. in the ranks stated, with effect from, and with sen. of, the dates indicated :—

Flying Offrs.—F. P. Adams; November 18. W. G. Nicholls; November 18. S. A. Lane; November 22.

Pilot Offr. on Prob.—A. R. M. Brain; November 15.

Flt. Lieut. L. H. Slatter, O.B.E., D.S.C., D.F.C., is placed on half pay, Scale B, from January 11, 1922, to March 10, 1922, inclusive. Flying Offr. R. Stephenson, D.F.C., is dismissed the Service by sentence of Gen. Court-martial; November 12. Flt. Lieut. C. W. Caulfeild-Browne resigns his perm. commn., and is permitted to retain the rank of Captain; November 30. The following resign their short service commns. :—Flt. Lieut. G. J. Monson-Fitzjohn; November 17. Pilot Offr. on prob. F. H. Stuart-Murray; November 22. Flying Offr. M. V. Molony (Lieut. Q.O.R.W. Kent R.) relinquishes his temp. commn. on resigning his commn. in the Regular Army, and is permitted to retain the rank of Lieut.; December 3. The following Flying Offrs. are placed on the retired list :—P. G. Whittle; November 13. W. Fenton; November 30.

Stores Branch

H. E. Young is granted a short service commn. as a Flying Offr., with effect from, and with sen. of, November 19. The temp. commn. on probation of Flying Offr. E. D. Preston is terminated on cessation of duty; November 18.

Medical Service

T. J. D. Atteridge is granted a short service commn. as a Flying Offr., with effect from, and with sen. of, November 16. Lieut. (temp. Capt.) G. W. Allen, Army Dental Corps, is granted a temp. commn. as a Flt. Lieut. in the R.A.F., while attached for R.A.F. duty, with effect from September 12, with sen. January 31, 1920.

Nursing Service

The following are confirmed in their appts. as Staff nurses, with effect from the dates indicated :—Miss G. E. M. Clubb; April 12. Miss M. G. Wiseman; May 14.

R.A.F. INTELLIGENCE

Appointments.—THE following appointments in the Royal Air Force are notified :—

Group-Captains.—David Munro, C.I.E., M.B., F.R.C.S. (E), from R.A.F. Depôt (Inland Area) to Air Ministry to be Director of Medical Services. 26.11.21.

Squadron-Leaders.—J. A. G. de Courcy, M.C., to R.A.F. Base, Gosport (Costal Area). On ceasing to be attached to Marine and Armament Experimental Establishment. 17.11.21. W. Millett, from No. 7 Group Headquarters, (Inland Area) to Headquarters, Inland Area. 16.11.21. R. H. Peck, O.B.E., from No. 1 Flying Training School (Inland Area) to Iraq Group Headquarters) Middle East Area). 22.11.21. K. Biggs, M.C., D.P.H., from Headquarters, Coastal Area, to Headquarters, R.A.F. India. 22.11.21.

Flight-Lieuts.—G. H. Hall, A.F.C., from half-pay list, to Iraq Group Headquarters (Middle East Area). 26.11.21. G. H. Errington, from Headquarters (Coastal Area) to R.A.F. Depôt (Inland Area). 1.11.21. D. H. W. Williamson from Electrical and Wireless School (Inland Area) to R.A.F. Depôt (Inland Area). 3.10.21. G. Oliver from Electrical and Wireless School (Inland Area) to Headquarters, Middle East Africa. 22.11.21. P. E. Gwyer, M.B.E., from No. 39 Squadron (Inland Area) to Engine Repair Depôt (Middle East Area). 22.11.21. A. S. Thompson, from No. 1 Flying Training School (Inland Area) to Headquarters, Middle East Area. 22.11.21. W. H. E. Kemp, A.F.C., from No. 25 Squadron (Inland Area) to Headquarters, R.A.F., India. 22.11.21. J H. W. Fitzgerald, from Central Flying School (Inland Area) to R.A.F. Depôt (Inland Area). (Supernumerary Non-effective.) 15.9.21. H. J. Edgar, from R.A.F. Depôt (Inland Area) to Air Ministry (C.G.C.A.). 23.11.21. C. H. Elliott-Smith, A.F.C., from Palestine Group Headquarters (Middle East Area) to R.A.F. Depôt (Inland Area). 7.11.21. W. B. Everton, from R.A.F. Depôt (Inland Area) to School of Technical Training (Men) (Inland Area). 8.12.21.

Flying-Officers.—H. E. Young, to No. 4 Stores Depôt. (Supernumerary.) On appointment to short service commission. 19.11.21. William G. Nicholls, to R.A.F. Depôt (Inland Area). (Supernumerary.) On appointment to short service commission. F. P. Adams, from R.A.F. Depôt (Inland Area) (Supernumerary.) On appointment to short service commission. 18.11.21. S. A. Lane, to R.A.F. Depôt (Inland Area) (Supernumerary). On appointment to short service commission. 22.11.21. W. J. G. Walker to Research Laboratory and Medical Officers' School of Instruction (Inland Area). On appointment to short service commission. 7.11.21. E. C. K. H. Foreman, to Research Laboratory and Medical Officers' School of Instruction (Inland Area). On appointment to short service commission. 7.11.21.

⁂ ⁂ ⁂ ⁂

War Compensation

FROM the first report of the War Compensation Court, published on December 5 and covering the year ended August 16 last, it appears 1,203 claims have been determined. In this list the Blackburn Aeroplane and Motor Co. appear for the sum of £29,644 for occupation of premises.

Martlesham Heath Re-Union Dinner

THE second annual re-union dinner for past and present officers of the Aeroplane Experimental Establishment, Martlesham Heath, will be held in London on Friday, January 20, 1922. The time and place will be announced later.

It is requested that former members of that station will communicate with Capt. P. G. Robinson, Room A.139, Air Ministry, London, W.C. 2.

The London Aero Models Association

THIS Association has been formed by a number of pioneer aero modellists, and it is hoped that adequate support will be forthcoming to enable good work to be done.

Mr. A. E. Jones, 48, Narcissus Road, West Hampstead, N.W. 6, has been appointed Hon. Sec. *pro tem.*, while the Hon. Treasurer is Mr. R. E. Coleman, 30, Hanley Road, Finsbury Park, N.W. 4. The Committee is composed of Messrs. C. E. Lane, A. Rippon, J. E. Louch, A. B. Clark, R. E. Coleman, C. J. Burchell, D. A. Paveley, W. E. Evans, L. G. Hatfull, F. de P. Green, A. Wilson, and the total membership to date is 35. The general flying grounds are at Wimbledon Common, S.W., Parliament Hill Fields, N.W. Blackheath, S.E, and Wormwood Scrubbs, W.

The Association are having a dinner, which will be held today, at 20, Great Windmill Street, Piccadilly, W.1.

A series of lectures has been arranged, and those who are interested and would like to attend any of these meetings should get in touch with Mr. Jones.

⁂ ⁂ ⁂ ⁂

PUBLICATIONS RECEIVED.

Report No. 120. Practical Stability and Controllability of Airplanes. National Advisory Committee for Aeronautics, Navy Building, Washington, D.C., U.S.A.

Technical Note No. 66. Göttingen Wind Tunnel for Testing Aircraft Models. By L. Prandtl. National Advisory Committee for Aeronautics, Navy Building, Washington, D.C., U.S.A.

Technical Note No. 69. An Investigation on the Effect of Raked Wing Tips. By H. F. Norton. National Advisory Committee for Aeronautics, Navy Building, Washington, D.C., U.S.A.

Technical Note No. 71. Experiments with Slotted Wings. By C. Lachmann. Translated from "Zeitschrift für Flugtechnik und Motorluftschiffahrt." National Advisory Committee for Aeronautics, Navy Building, Washington, D.C., U.S.A.

Technical Note No. 73. The Choice of Wing Sections for Airplanes. By Edward P. Warner. National Advisory Committee for Aeronautics, Navy Building, Washington, D.C., U.S.A.

⁂ ⁂ ⁂ ⁂

AERONAUTICAL PATENT SPECIFICATIONS

Abbreviations : cyl. = cylinder; I.C. = internal combustion; m. = motors

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

APPLIED FOR IN 1920

Published December 8, 1921

12,430. J. HIGGINBOTTOM. Heavier-than-air flying machines. (171,122.)

19,738. H. JUNKERS. Structural parts of aeroplanes and hydro-aeroplanes. (147,735.)

20,221. A. FLETTNER. Apparatus for steering aircraft. (148,308.)

23,335. F. PRATI. Method of and apparatus for determining the deviation of a compass. (171,165.)

23,723. SPERRY GYROSCOPE CO. Flywheels and bearings thereof. (171,186.)

24,419. D. J. MOONEY, E. E. BROWN and F. B. UNDERWOOD. Metal aeroplane wing construction. (171,210.)

26,466. M. B. RUSSELL. Rotary I.C. engines. (171,252.)

If you require anything pertaining to aviation, study "FLIGHT'S" Buyers' Guide and Trade Directory, which appears in our advertisement pages each week (see pages iii and xiv).

NOTICE TO ADVERTISERS

All Advertisement Copy and Blocks must be delivered at the Offices of "FLIGHT," 36, Great Queen Street, Kingsway, W.C. 2, not later than 12 o'clock on Saturday in each week for the following week's issue.

FLIGHT

The Aircraft Engineer and Airships

36, GREAT QUEEN STREET, KINGSWAY, W.C. 2.

Telegraphic address: Truditur, Westcent, London.
Telephone: Gerrard 1828.

SUBSCRIPTION RATES

"FLIGHT" *will be forwarded, post free, at the following rates :—*

UNITED KINGDOM	s.	d.	ABROAD*	s.	d.
3 Months, Post Free....	7	7	3 Months, Post Free....	8	3
6 " "	15	2	6 " "	16	6
12 " "	30	4	12 " "	33	0

These rates are subject to any alteration found necessary under abnormal conditions and to increases in postage rates.

* *European subscriptions must be remitted in British currency.*

Cheques and Post Office Orders should be made payable to the Proprietors of "FLIGHT," 36, Great Queen Street, Kingsway, W.C. 2, *and crossed London County and Westminster Bank, otherwise no responsibility will be accepted.*

Should any difficulty be experienced in procuring "FLIGHT" *from local newsvendors, intending readers can obtain each issue direct rom the Publishing Office, by forwarding remittance as above.*